Australia's National Science Agency

CSIRO electric vehicle projections

Methodology and preliminary results

Paul Graham | 28 September 2022

Forecasting approach and changes since 2021 EV forecasts

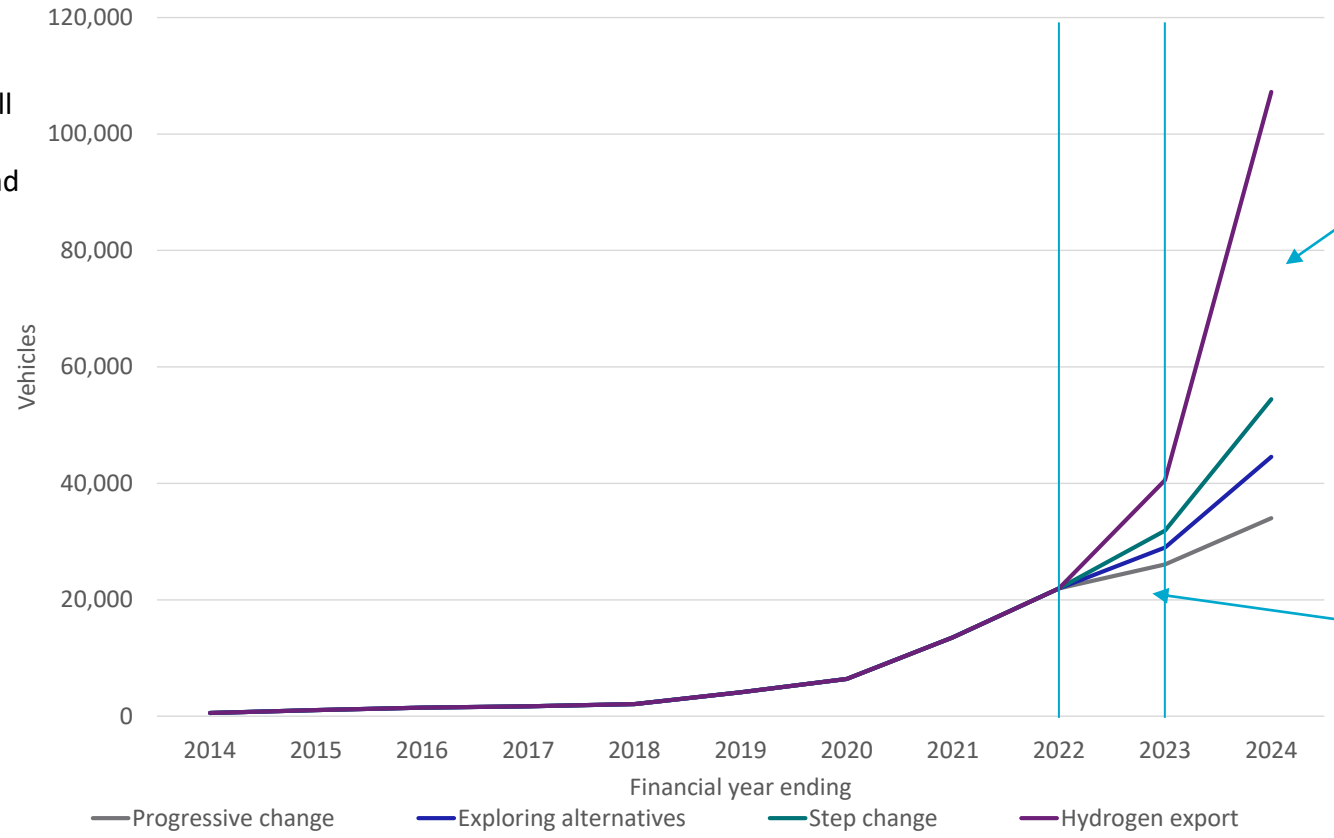
Short and long term models

Next 12 months	2023-24 to majority EV sales	Majority EV sales to end of projection
Regression analysis	Consumer technology adoption model	Market retirement model
	Transport demand model	

The retirement model is deployed from around 60% sales but with some leeway to account for plausible global supply chain shifts.

Short term projections - sales

National. Includes all types of electric and fuel cell vehicles



Consumer technology adoption model takes over

Regression with divergence imposed

Minor changes to projection method

Drivers for long term outcomes

- Previously thought governments would need to ban or refuse registration of ICE vehicles. ACT is example (2035)
- Based on statements by manufacturers, it is now likely that accelerated ICE scrapping will occur mostly due to commercial withdrawal of services
  - Diversion of resources away from ICE vehicle and parts manufacturing
  - Loss of critical mass in commercial liquid fuel supply

Changes to charge profiles are significant

Previous charge profile data was based on overseas trials and two older Australian trials. More up to date charge profile data has become available from Australian trials

- Energex and Ergon Energy network
- Origin Energy
- University of Queensland / Electric Vehicle Council
- Also, additional overseas data

New data has meant significant changes to the daily shape (shown in coming slides):

- Demand during peak for convenience profile has more than halved
- Higher charging on weekend (previous assumptions were reversed based on traffic)
- Better understanding of TOU profile

Policy changes since 2021 are significant

There were no significant targets and limited subsidies when projection modelling concluded early 2021.

Key new policies

- State targets in NSW, VIC, QLD, SA and ACT
  - Aligned on either 50% sales in 2030 or 100% by 2035
- Subsidies of around $3000-$3500 in NSW, VIC, QLD, SA and WA and other incentives in other states/territories
- New funding for charging infrastructure
- Commonwealth exemption on fringe benefits tax
- Road user chargers – increases the payback period

Potential domestic vehicle emissions standards are not included. However, the inclusion of impacts from global manufacturing changes means that Australia is otherwise prevented from maintaining a high ICE share fleet in the long run.

Other significant changes

- Strong sales growth in 2021 and early 2022 and greater confidence in historical data due to:
  - Better access to historical sales data through Electric Vehicle Council and Federal Chamber of Automotive Industries (FCAI)
  - Tesla data included in FCAI's VFACTS publication from 2022

- An update of historical fleet data has increased the share of larger vehicles

Key assumptions

	CSIRO 2021 Forecasts				CSIRO 2022 Forecasts			
	Slow growth	Progressive change	Step change	Hydrogen super power	Progressive change	Exploring alternatives	Step change	Hydrogen export
Alignment with state 50% sales by 2030 targets	NA	NA	NA	NA	Underachieved by 30 percentage points	Underachieved by 15 percentage points	Met	Exceeded by 15 percentage points
ICEs not available from	2070	2050	2040	2035	2065	2045	2040	2035
ICE services unavailable from*	NA	2055	2050	2045	NA	2055	2050	2045
Timing of SREV parity	2035	2030	2025	2025	2035	2030	2027	2025

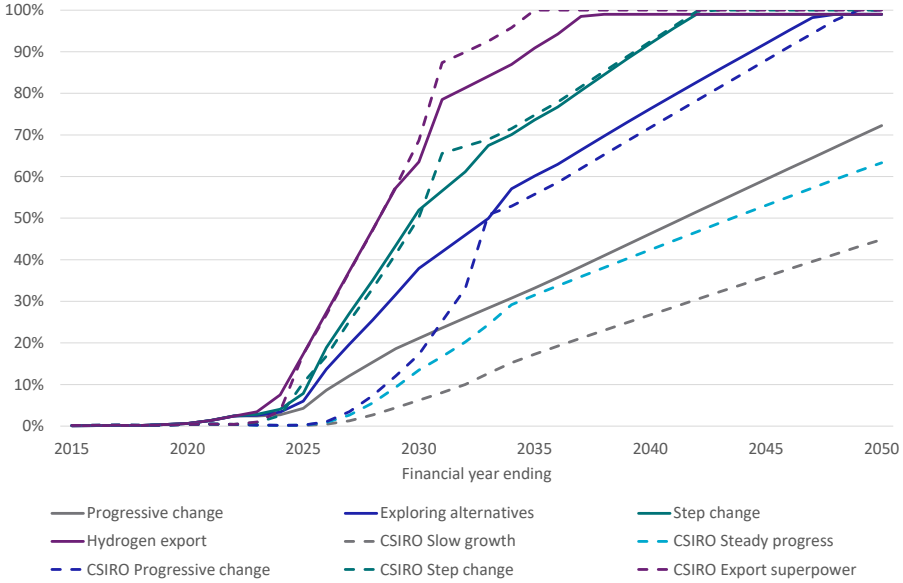
* We allow 1% ICE in road fleet for special purpose or historic vehicles

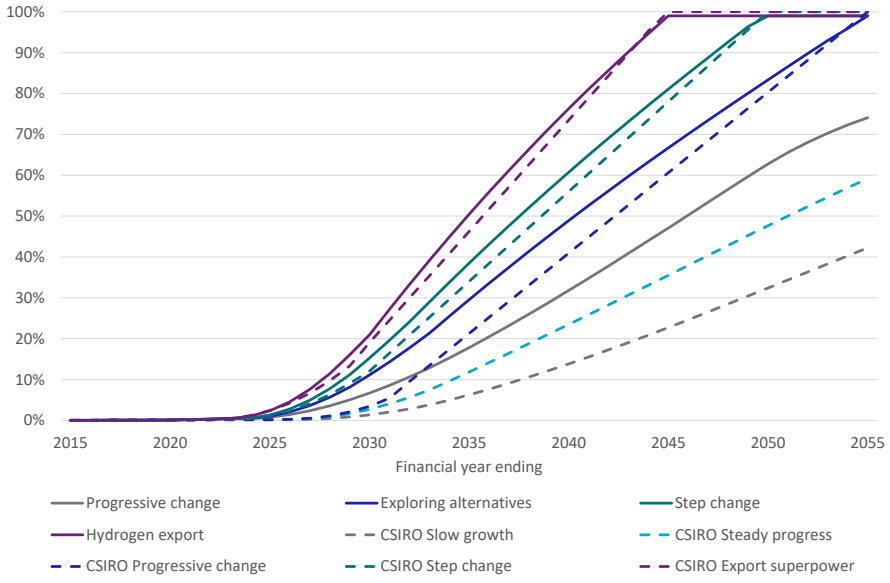
Preliminary Results

Key
Solid: prelim 2022
Dashed: 2021

Sales share (left) and fleet share(right)

National. Includes all types of electric and fuel cell vehicles. Historical data is sourced from EVC and FCAI





Step change aligns to 2030 state targets (50%)

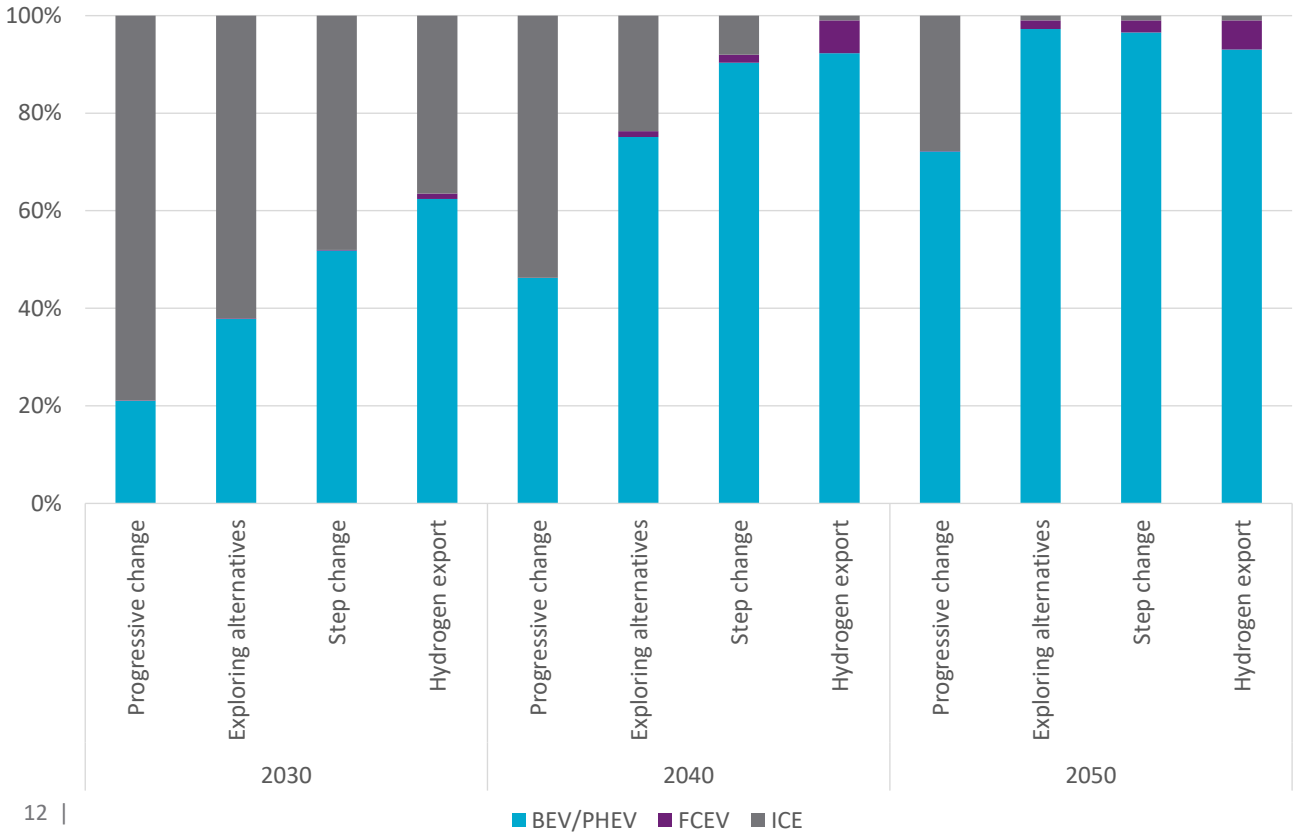
Sales shares of less than 10% in 2030 in some 2021 projections less plausible with new policies

99% saturation allows for some special purpose ICEs remaining

Saturation timing depends on rate of global collapse of ICE vehicle services reinforced by vehicle emissions standards and government 'bans'

Sales: all vehicle types

National

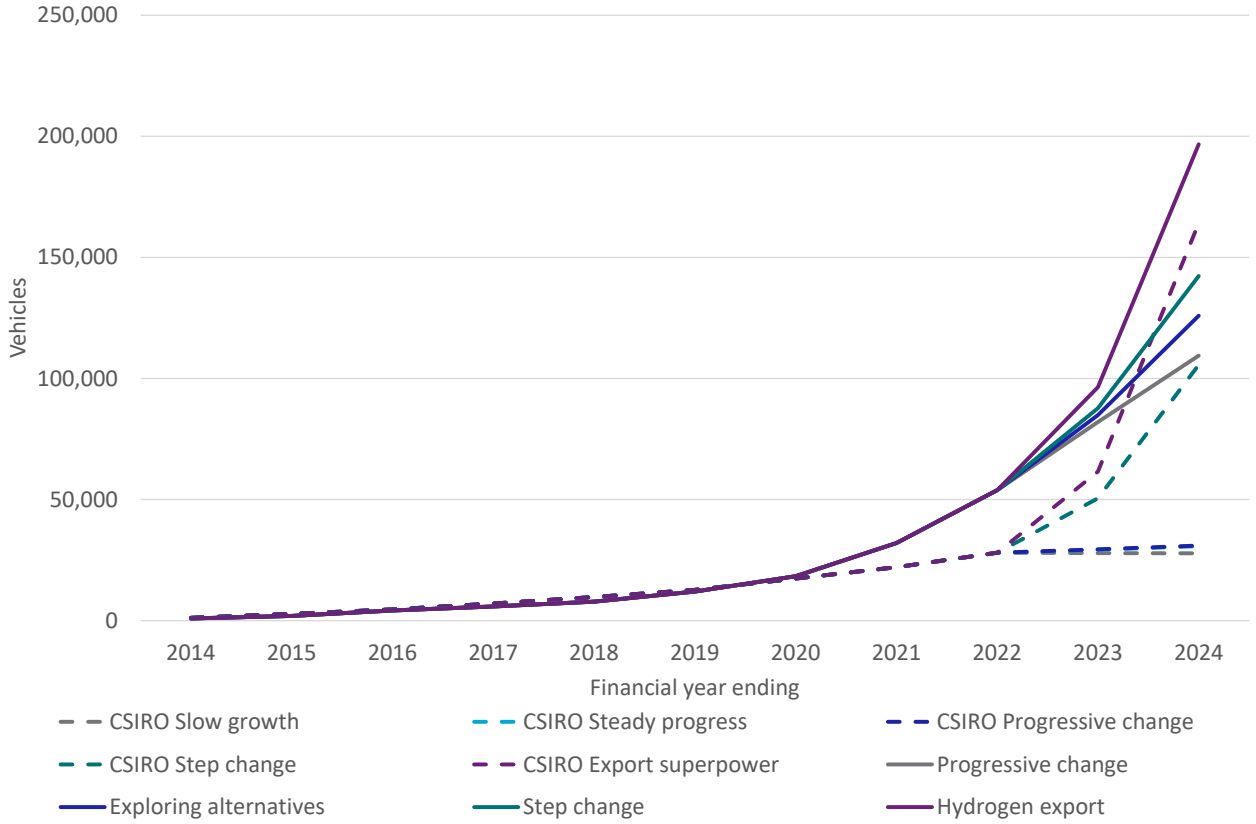


Fuel cell vehicles represent 30%-70% share of the large articulated truck fleet across the scenarios but only 1% to 5% of cars.

Articulated trucks are less than 2% of the road fleet

Short term projections - number

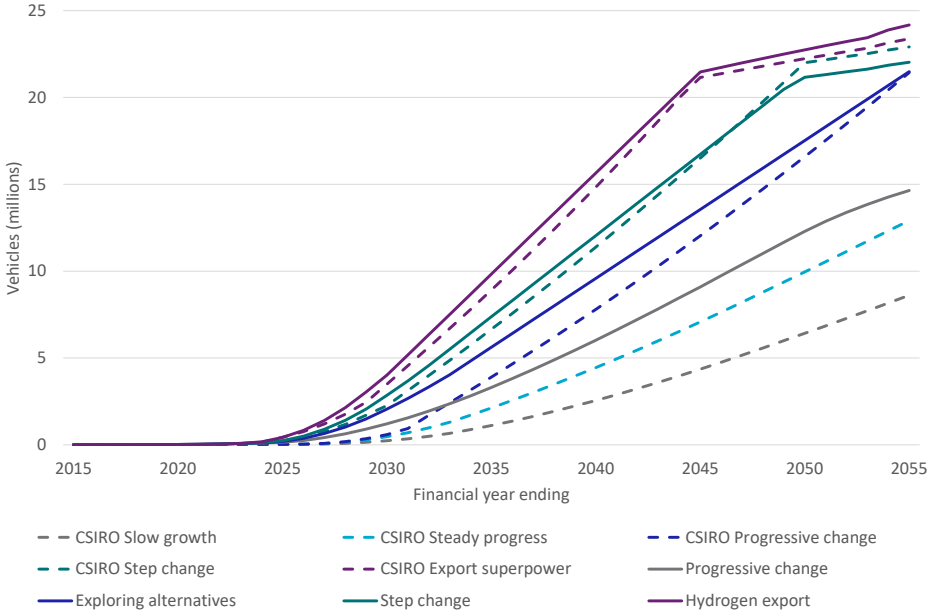
National. Includes all types of electric and fuel cell vehicles

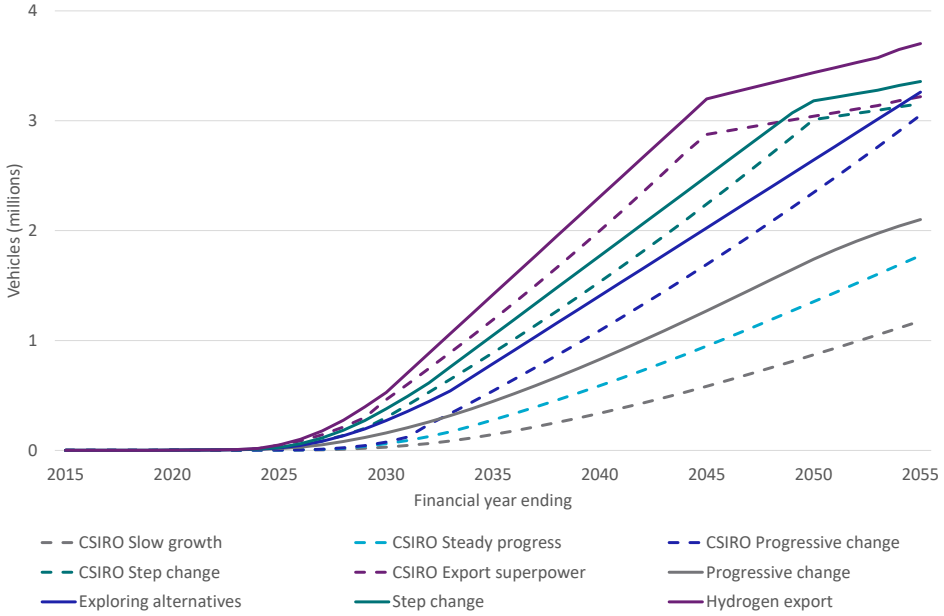


New projections will lead to an upward revision of the lower end of the previous range

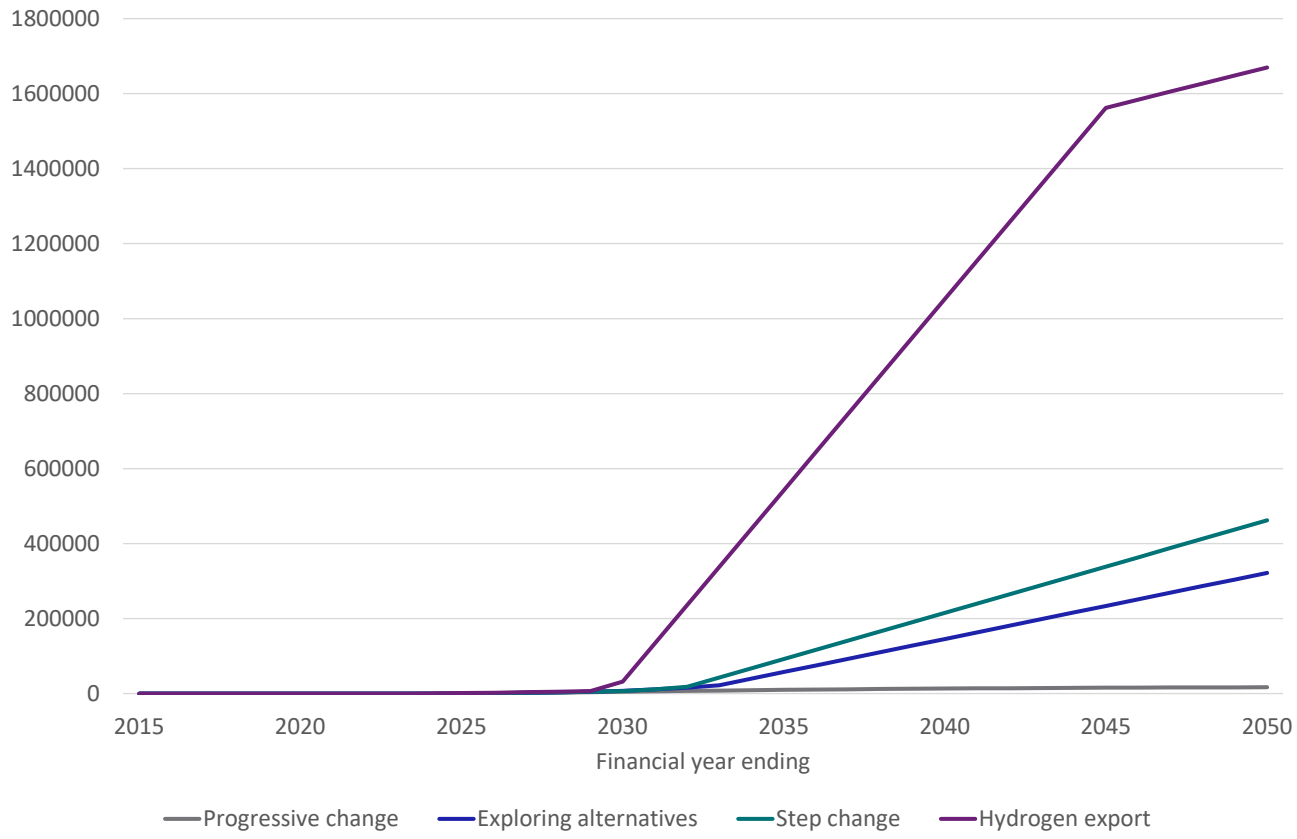
NEM (left) and SWIS (right) EV numbers

Includes all types of electric and fuel cell vehicles

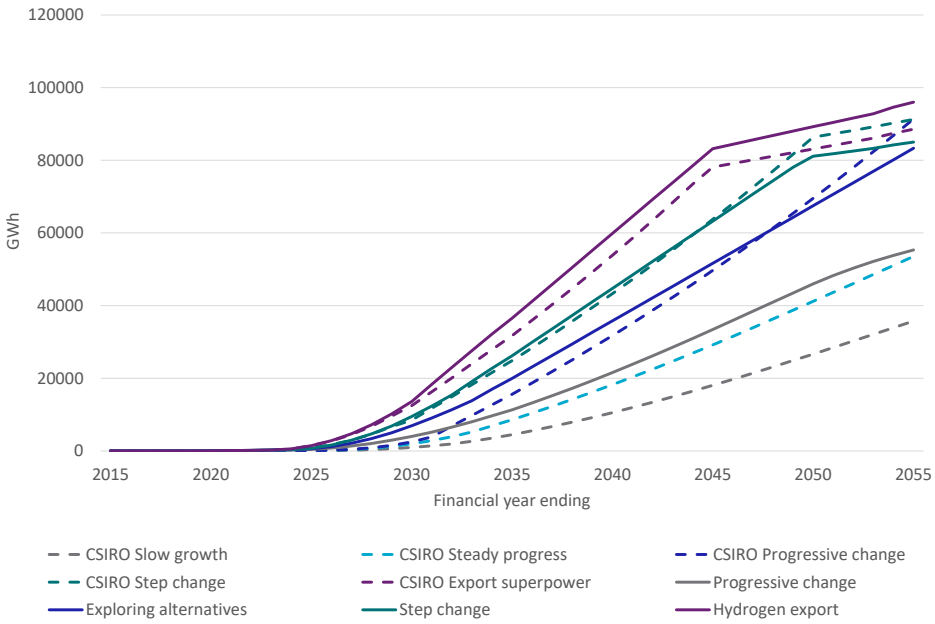


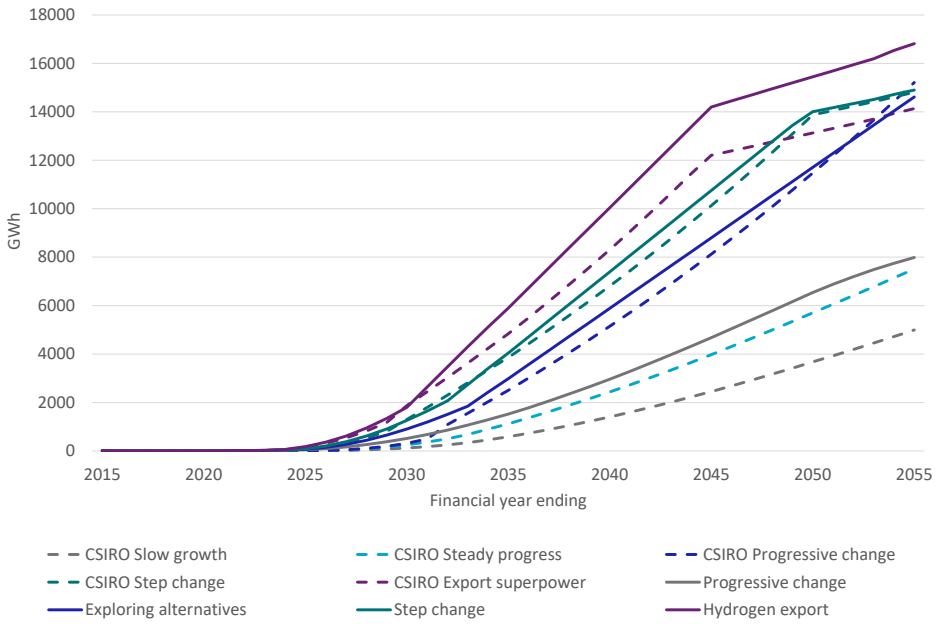


Fuel cell electric vehicle numbers



NEM (left) and SWIS (right) Consumption

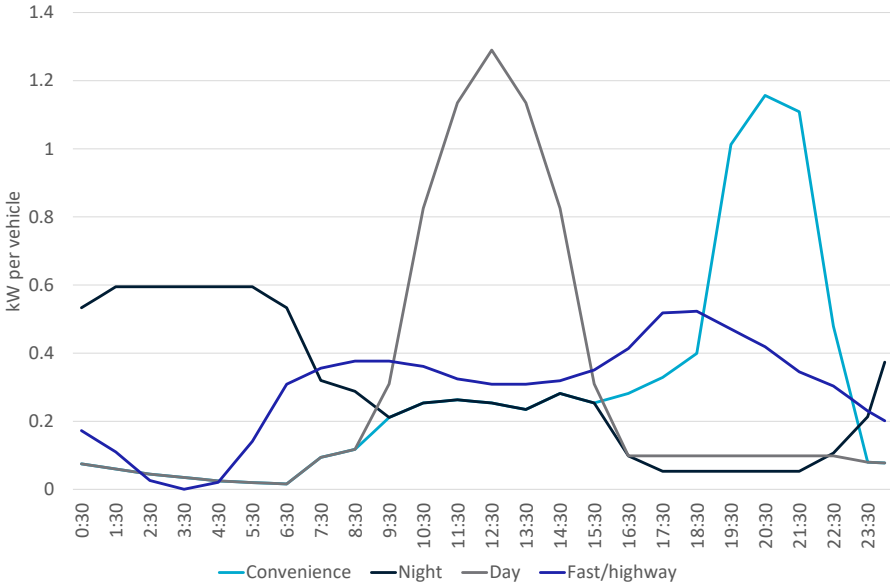




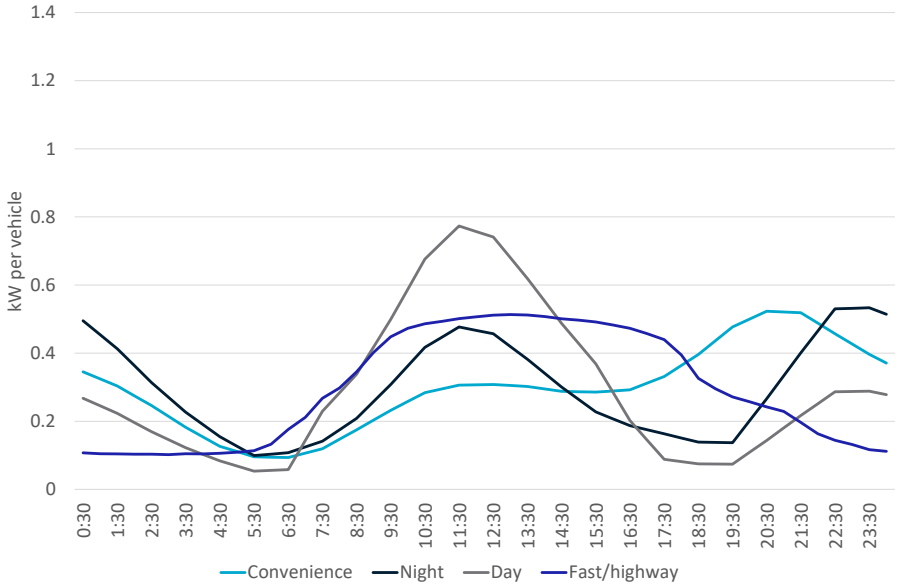
EV charge profiles: major revisions

Cars

2021 profiles



Revised profiles

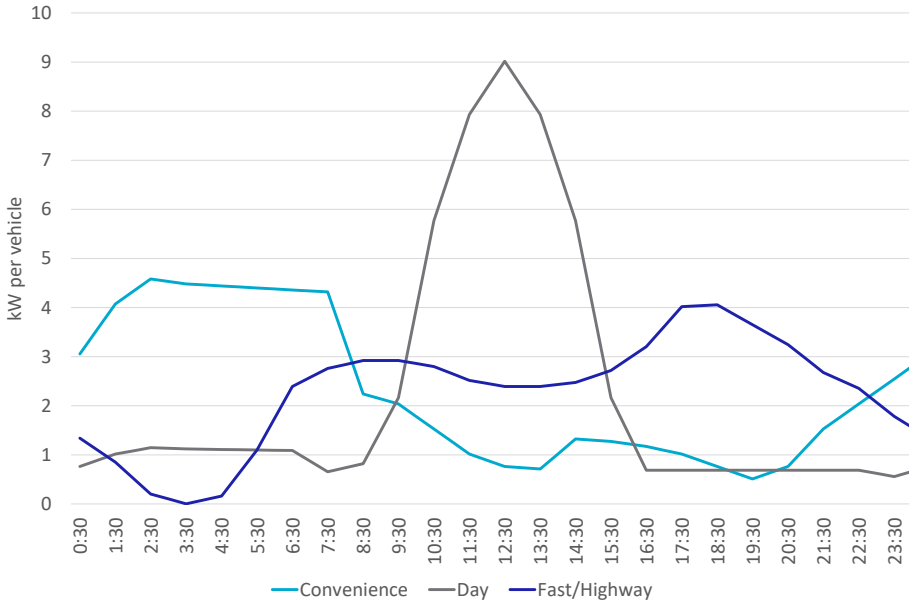


Sources: AEMO, Origin energy, UQ/EVC, UK trials, and Energex and Ergon Energy Networks EV SmartCharge (Queensland)

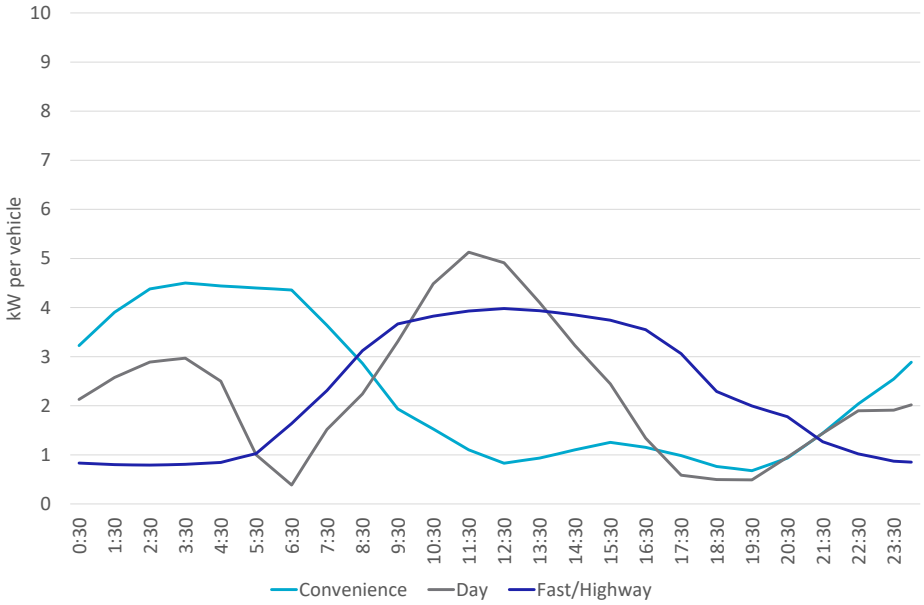
EV charge profiles: major revisions

Trucks

2021 profiles



Revised profiles



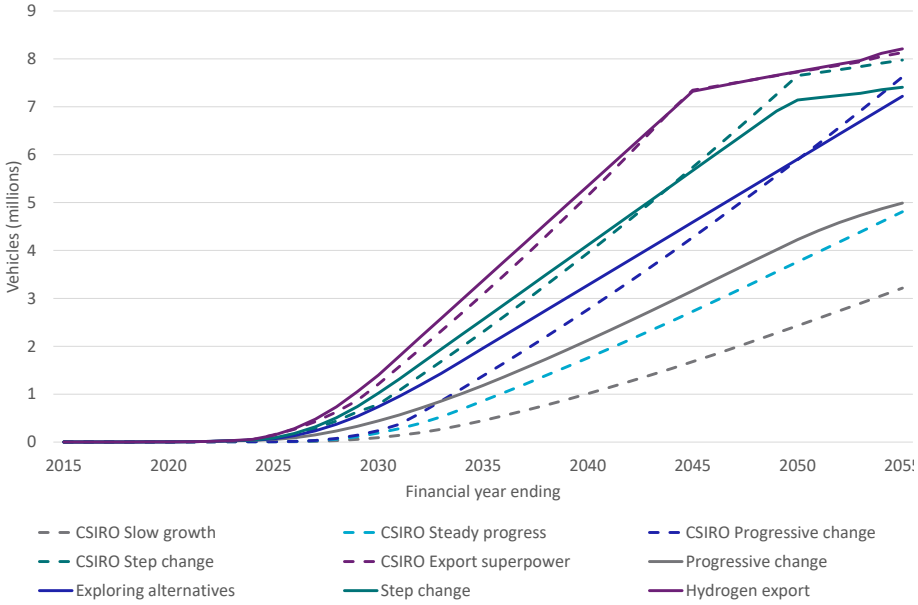
Building on learnings from available car profiles

State results appendix

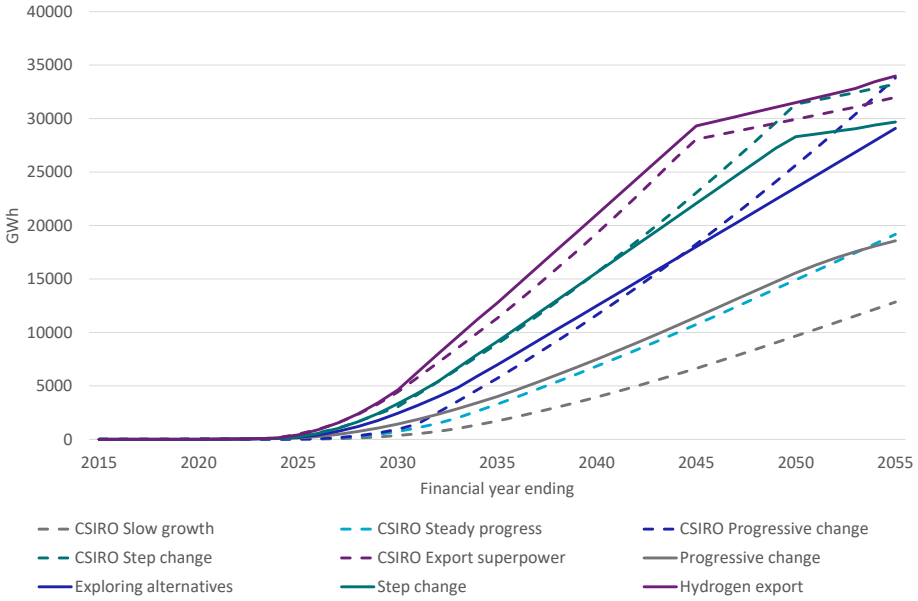
Number of vehicles and consumption NSW

BEV and PHEV

Vehicles



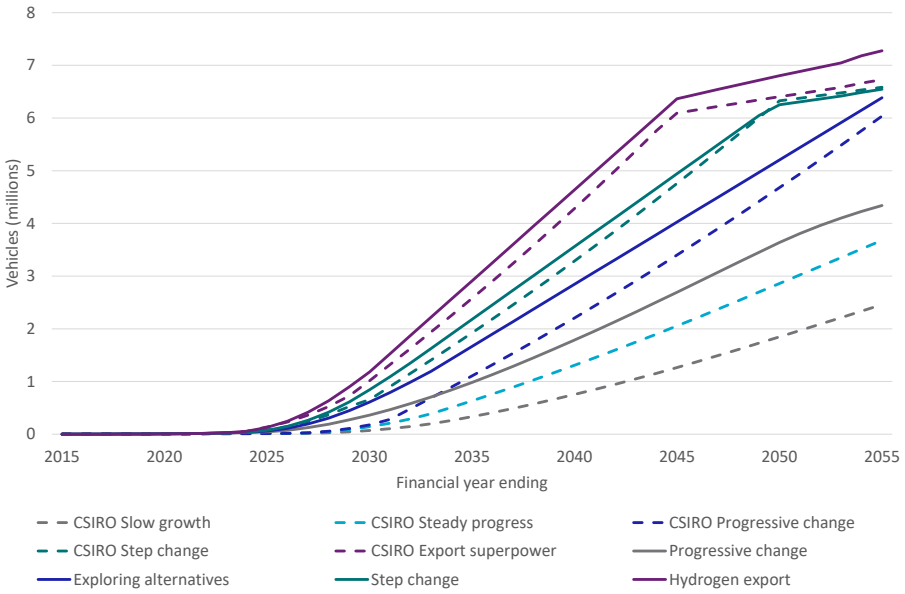
Consumption



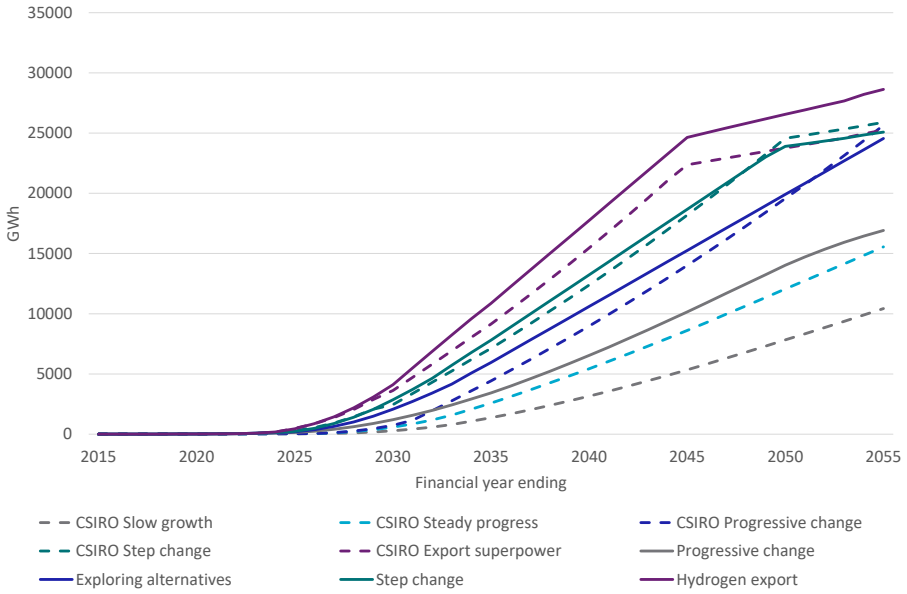
Number of vehicles and consumption VIC

BEV and PHEV

Vehicles



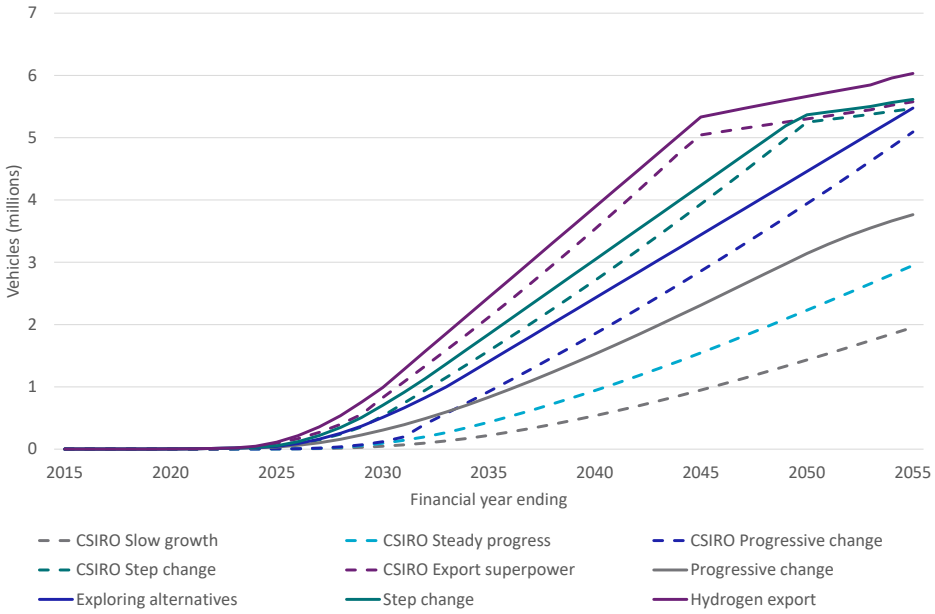
Consumption



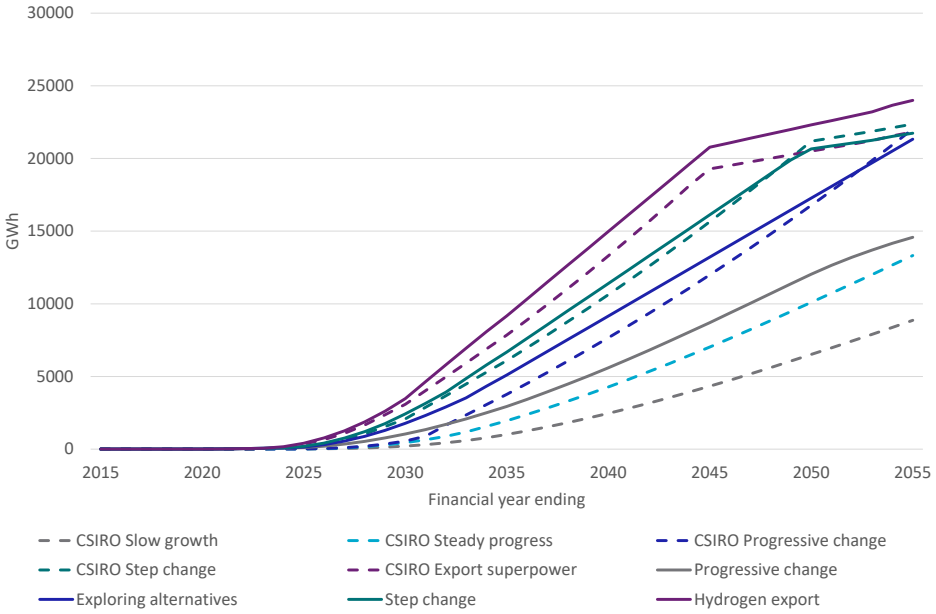
Number of vehicles and consumption QLD

BEV and PHEV

Vehicles



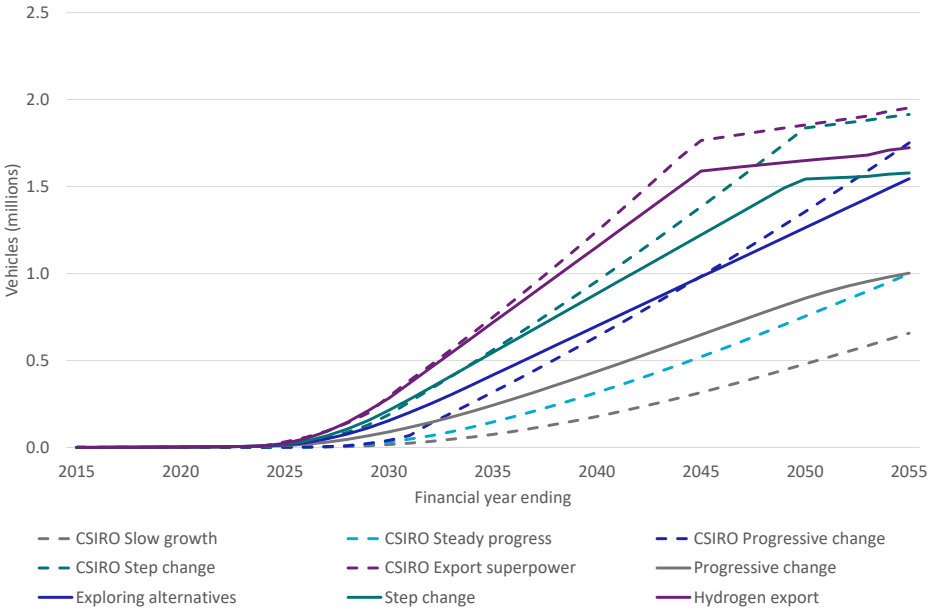
Consumption



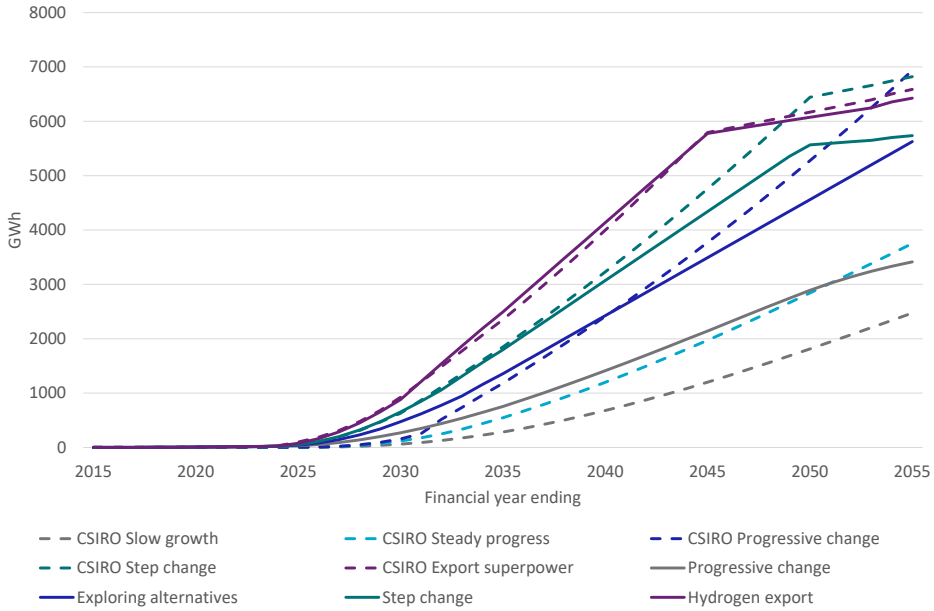
Number of vehicles and consumption SA

BEV and PHEV

Vehicles



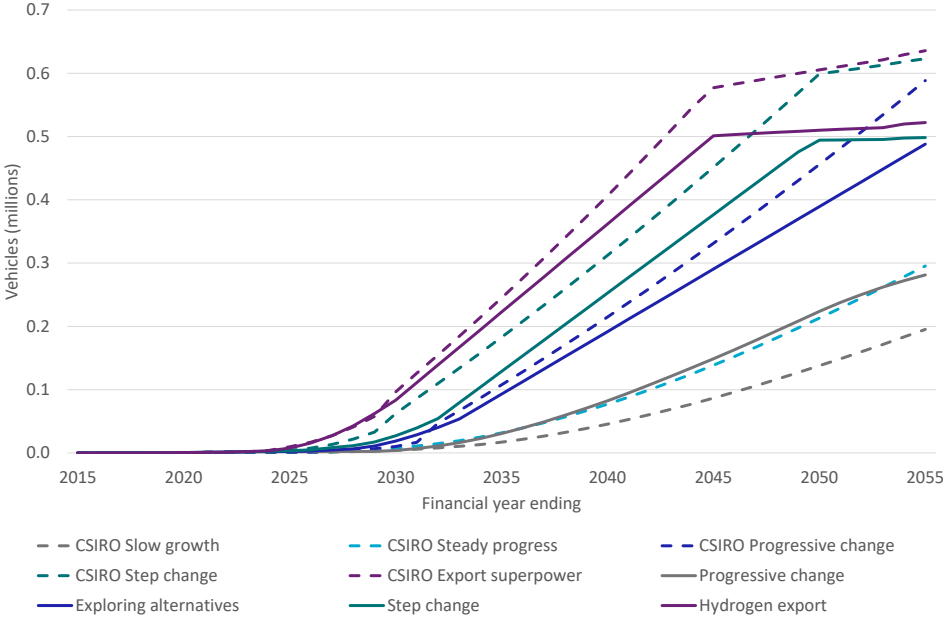
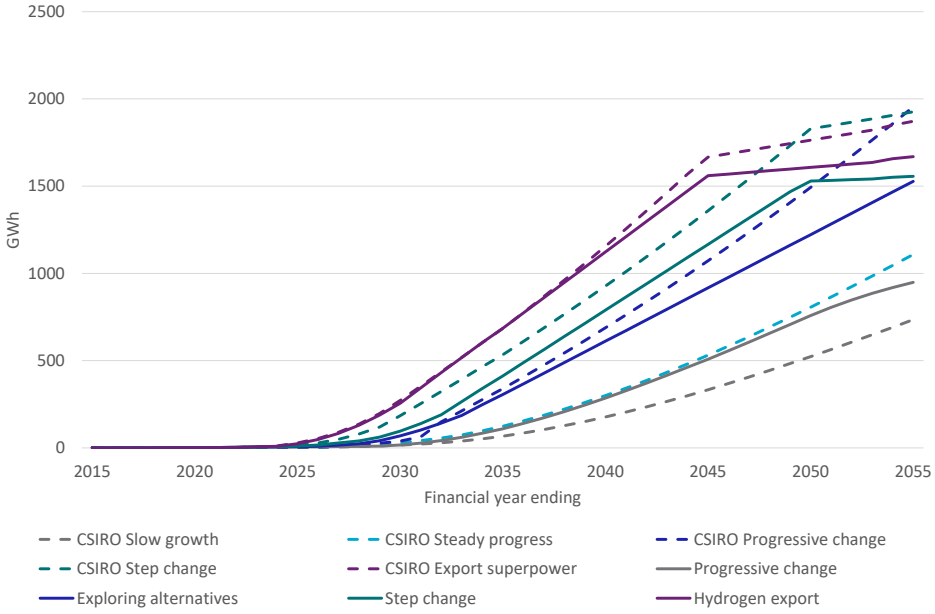
Consumption



Number of vehicles and consumption TAS

BEV and PHEV

Vehicles



Consumption